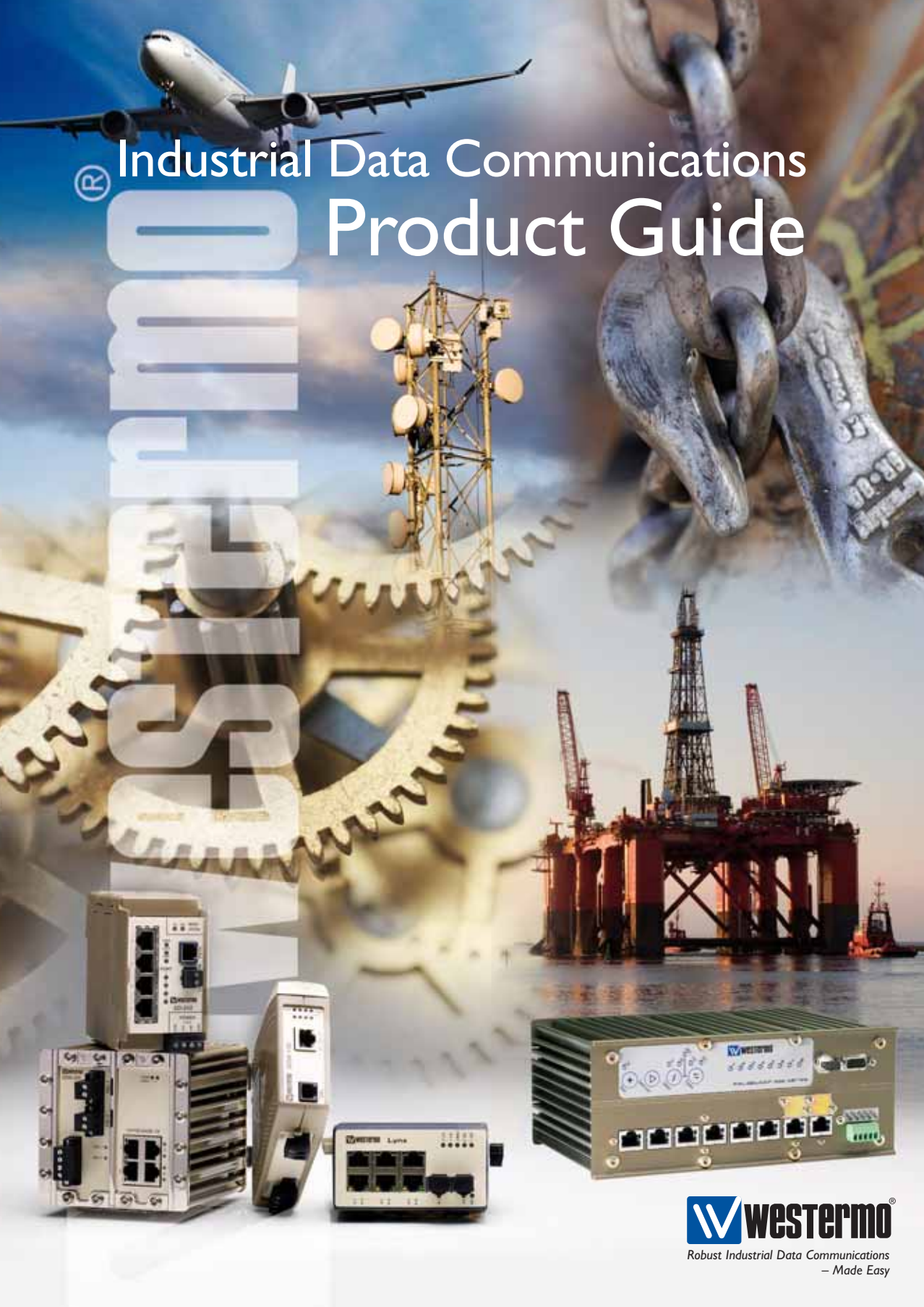
Industrial Data Communications
Product Guide



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Robust Industrial Data Communications – Made Easy

Westermo World Wide . . . www.westermo.com

Westermo was established in the early 1970s. The head office being located 150 km southwest of Stockholm in Sweden. Over the past three decades Westermo has grown with subsidiaries being established in Sweden, England, Germany, Norway, France, Singapore and sales partners appointed in over 30 Countries worldwide.

Today the Westermo brand name is synonymous with Robust Industrial Data Communications.

Our 30 years of experience in the industrial marketplace goes far beyond our own products. We understand the problems that can occur in applications installed in the toughest industrial environments and therefore we can offer you the most effective and economical solutions.

All our products are specifically designed to operate reliably in harsh industrial environments and in applications requiring the highest levels of reliability and availability.

Let Westermo be your first choice for robust industrial data communication solutions.

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Robust Industrial Data Communications – Made Easy

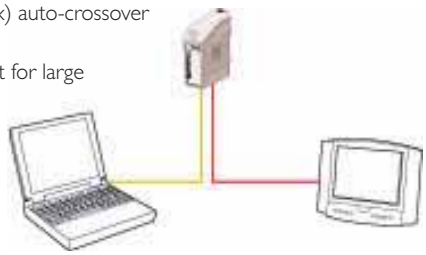
- Far End Fault Indication
- Transparent to large frames (VLAN, QoS)
- Single / Multimode transceivers
- Distances up to 40 km (fibre, singlemode)
- Plug & Play
- Redundant Power
- –25°C to +70°C

MCW-211
Media Converter

The MCW-211 is an Industrial Ethernet FX/TX Media Converter. The MCW-211 converts between Ethernet 10/100 Base-TX and 100 Base-FX. The unit is easy to install and use due to features like auto-negotiation (speed/duplex) auto-crossover and auto-polarity.

The media converter is transparent for large data packets (VLAN or QoS). It is also possible to set speed, duplex and flow control via DIP-switches.

The FX side supports Far-End-Fault indication.

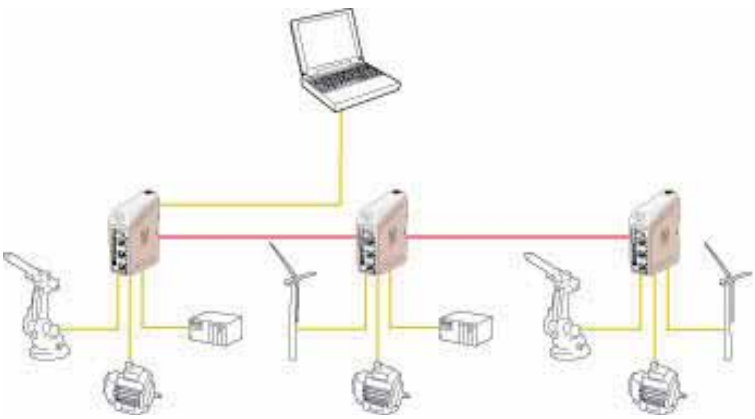


A link fault from either side will be forwarded to the other side – Link Fault Forwarding.

- 10 / 100BaseT (Ethernet)
- Plug & Play
- Port Monitoring
- DIP-switch Configuration
- Extended Ethernet Frames (VLAN, QoS)
- –25°C to +70°C
- Tri-Galvanic Isolation
- Full 100 Mbit "Throughput"

SDW-500
Unmanaged Ethernet Switch

The SDW is a 5 port switch which can be configured with one or two fibre optic transceivers for either multi- or singlemode cables. The switch is a plug & play unit but offers also the possibility that each port can be configured by DIP-switches. The screen of each TX port is individually isolated to help prevent earth loop problems within the network.



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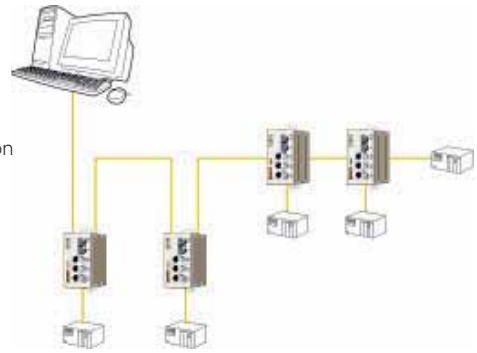
The Lynx Series – One switch many Solutions

The Lynx family of switches consisting of two different function levels and two types of approvals, Industrial and SA (substation).
Those options will give you the ability to select the perfect switch for your application providing optimum functionality at the best value. It is also possible to choose 10 / 100 Mbit/s or 1 Gbit/s transceivers on the fibre optic ports.

- 10 / 100 / 1000 Mbit/s
- Distances on fibre up to 120 km
- Multi- or Singelmod transceivers
- Bi-di transceiver (send / receive on one fibre)
- 2 configurable fibre ports
- IP 40 / Metal Housing
- Temperature range −40°C up to +70°C
- Redundant Power (19 – 60V DC)
- User configurable Fault Contact
- All switches in the network configurable from any port on any switch with IP Config Tool
- Web tool for configuration

Lynx 100 / 1100

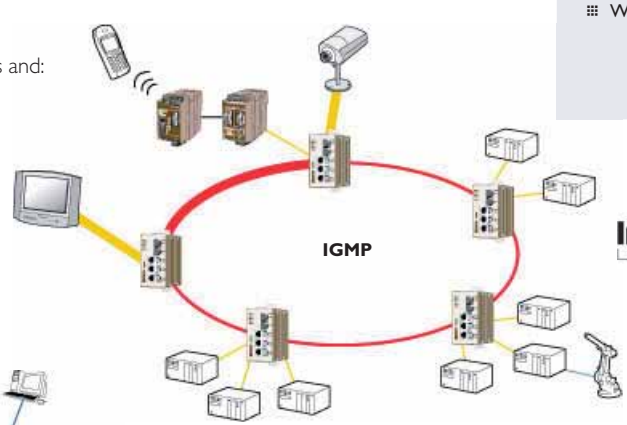
- SNMP
- Web configuration
  - QoS / IPToS
  - 4 priority queues
  - Strict priority
  - HoL blocking prevention



Lynx 400 / 1400

All 100 / 1100 features and:

- FRNT
- STP/RSTP
- VLAN
- IGMP Snooping
- MAC address filtering



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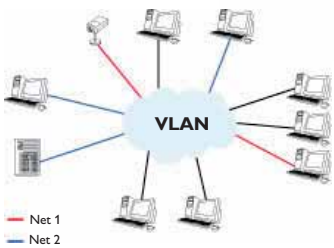

Fastest Switch on the Market

Our unique FRNT technology (**F**ast **R**ecovery of **N**etwork **T**opology) is the fastest existing protocol on the market to reconfigure a redundant network in case of any failure on the fibre optic link.
FRNT is able to reconfigure a redundant ring network consisting of up to 200 switches within 20 ms, regardless of network load.

- 8 configurable FX ports
- Distances on fibre up to 120 km
- Multi or Singlemode transceivers
- Bi-di transceiver (one fibre send / receive)
- IP 40 / Metal Housing
- Temperature range –40˚C up to +70˚C
- Redundant Power (19 – 60 VDC)
- User configurable Fault Contact
- All switches in the network configurable from any port on any switch with IP Config Tool

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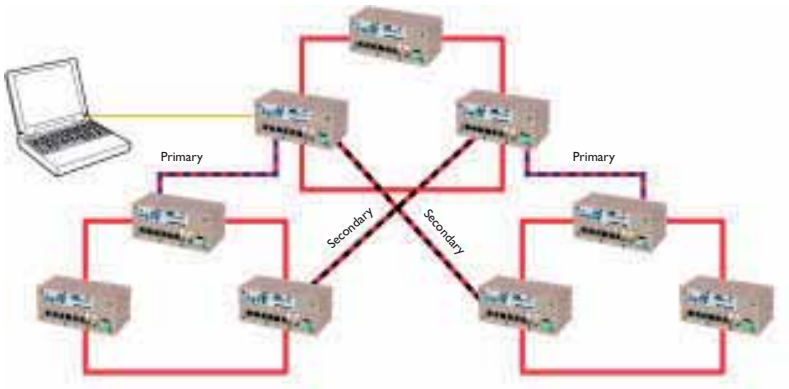
R208
8 port Managed Switch

The R208 switch has the same features as the L400. R208 also has "Bridge Link" functionality (FRNT v.1) to provide full redundancy in networks where sub-rings need to be connected resiliently.
The R208 can be configured with up to 8 fibre ports.



- GPS or Internal Clock
- GPS receiver interface RS-232 / 485
- NTP / SNTP (Network Time Protocol)
- RFC2030 / T1588 Compliant
- Accuracy better than 1 µs
- IRIG-B protocol
- PPS (pulse per second)

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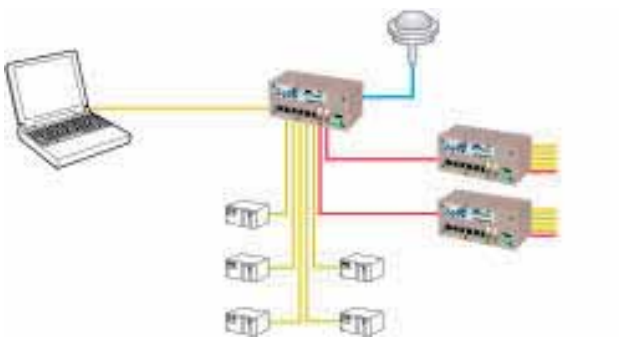
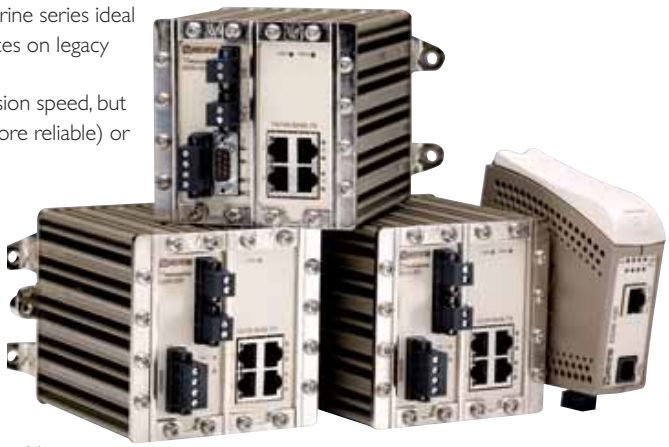
T208
8 port Synchronized Time Server

The embedded time server provides precise time stamping. When used with packet prioritization, an accuracy of 1 µs is possible. It is possible to use the internal clock or connect a GPS receiver to obtain an absolute time reference.
The T208 also has all the features of the R208.



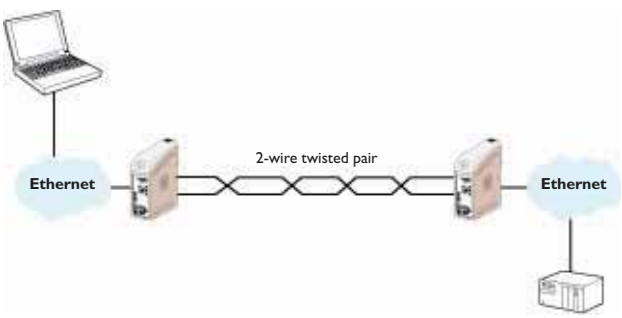
Wolverine series – Ethernet Extenders for Extreme Environments

The Wolverine series of SHDSL Ethernet extenders can be used in point-to-point, daisy chain or ring applications. SHDSL represents the best of several symmetric DSL technologies allowing transmission distances of up to 10 km with data rates of up to 5.7 Mbit/s.
The technology we use makes the Wolverine series ideal for transmitting Ethernet over long distances on legacy copper cables.
The units will auto-negotiate the transmission speed, but can also be forced to choose a slower (more reliable) or faster (less reliable) data rate.
Total galvanic isolation and transient protection are standard for all interfaces. The line interfaces are also equipped with extensive protection against current and voltage surges. The units are designed for extended temperature operation, have dual power inputs and can operate in extreme environmental conditions. The built-in 4 port Ethernet switch in the DDW-200 series makes it possible to create a simple Ethernet network with no additional network devices.



DDW-100
Ethernet SHDSL Extender

The DDW-100 is a plug and play Industrial Ethernet SHDSL extender. It is designed as a transparent extender for 10/100BaseTX networks.
This unit provides the possibility to re-use existing twisted copper pair with a high data rate at long distances.



- 10 / 100BaseT (Ethernet)
- SHDSL Twisted Pair
- Distances up to 10 km (6.2 mi)
- 192 kbit/s up to 2.3 Mbit/s
- Auto Speed Detection
- –25°C to +70°C
- Tri-Galvanic Isolation
- Redundant Power

DDW-220

DDW-221

DDW-222

DDW-200-series

- Plug and play
- Data rates up to 5.7 Mbit/s
- Distance up to 10 km
- Extensive line protection
- 2 x SHDSL
- SNMP and comprehensive diagnostic
- 16 – 60 VDC power supply
- Redundant power inputs
- Reverse polarity protection
- 4 ports Ethernet switch
- Web interface
- Made for extreme environments
  - – 40˚C to +70˚C
  - Metal housing
  - IP40
  - DIN mounting

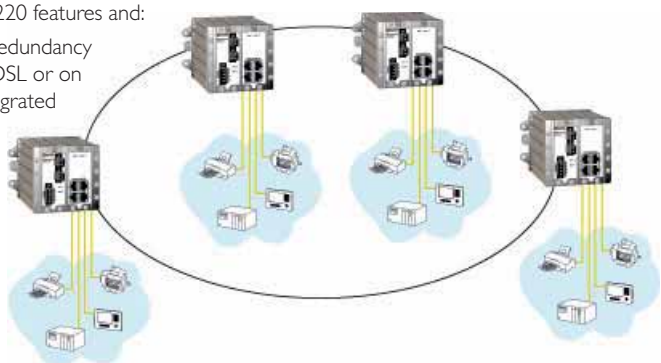
DDW-220

- Daisy chain applications
- Auto speed on SHDSL with reliable, normal or high-speed mode
- Total galvanic isolation
- Extensive line protection with over-current / voltage suppression
- Switch with 4 priority queues
- Industrial and rail approval

DDW-221

All DDW-220 features and:

- FRNT redundancy on SHDSL or on the integrated switch

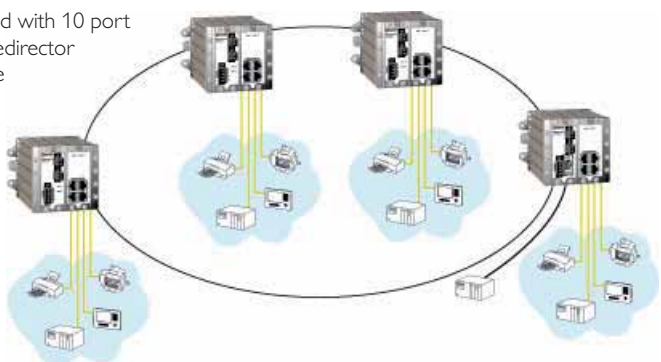


FRNT technology (**F**ast **R**ecovery of **N**etwork **T**opology), see page 5

DDW-222

All DDW-221 features and:

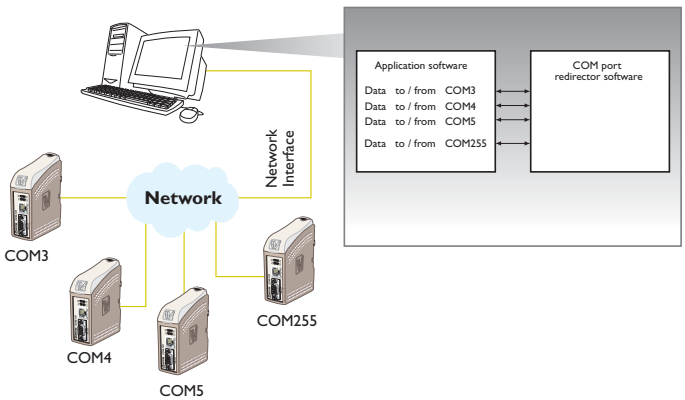
- Serial port
- Delivered with 10 port COM redirector software

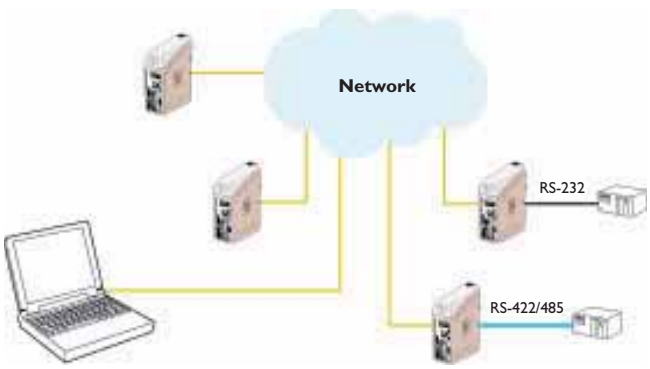


EDW-100 / 120
Serial Ethernet Adapter

The EDWs allow devices with only a serial port to communicate over an Ethernet network. They can be used either in point-to-point or point-to-multipoint applications.
The EDW-100/120 are supplied with a software utility allowing 2 virtual COM ports to be created on a PC. This software will redirect data, originally sent to a local COM port, to the remote serial interface of the EDW-100/120 meaning no changes are required to legacy applications. This makes it possible for "old" serial devices to communicate on a standard Ethernet network thus removing the need to maintain two different networks.
The EDW-100 has one serial port and EDW-120 has two.

- RS-232 / 422 / 485
- Modbus Gateway
- 115.2 kbit/s (serial)
- 10 / 100BaseT (Ethernet)
- Configurable Packing Algorithm
- Auto MDI / MDI-X
- Tri-Galvanic Isolation
- Redundant Power
- Virtual COM port emulation software supplied





Serial communication point-to-point

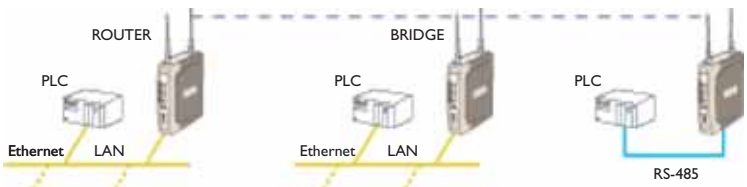
RM-80 / 90 / 240
- RM-80, 869 MHz (Europe), 76 kbit/s
- RM-90, 900 MHz (US), 200 kbit/s
- RM-240, 2.4 GHz, 802.11b, 11 Mbit/s
- Ethernet: 10/100baseT
- Serial: 115.2 kbit/s
- –35°C to +65°C
- AES / WEP encryption
- Firewall protection
- Access Point / Client / Repeater, Bridge / Router

Wireless Solutions

If the cost of wiring means that you cannot justify a project, then a wireless connection could be the solution for the project to be approved. It could be long distances where cabling is not even considered, or when there is an obstacle to wiring – public roads, railway lines, tarmac, waterways etc. It is also a solution for movable or moving equipment as well as temporary installations.
Using GSM/ GPRS gives you the possibility to connect to any serial device worldwide. One condition is, however, that it is within the coverage area of a GSM operator.

WLAN Access point and Client

The modems provide reliable and secure wireless connection between devices with Ethernet or serial RS-232 / RS-485 interfaces. A line of sight distance of 1 km (0.62 mi) is possible with the RM-240 and up to 5 km (3.1 mi) with the RM-80 and RM-90.



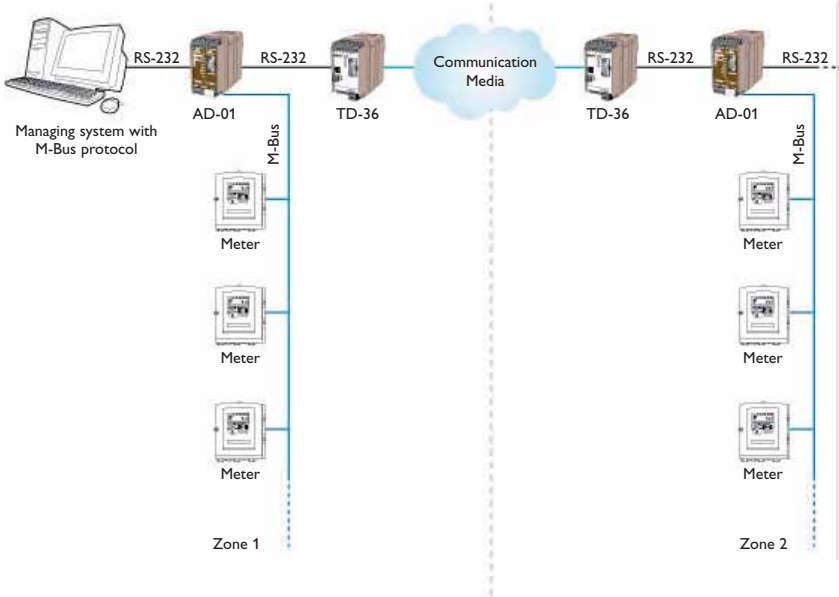
GDW-11
- 900 / 1800 MHz
- 850 / 1900 MHz (GD-01US)
- CSD: 14.4 kbit/s
- GPRS: 85.6 kbit/s
- Serial: 115.2 kbit/s
- –25°C to +50°C
- SMS via DTR
- Dial-up via DTR

GSM / GPRS

The GSM modems provide possibilities to control or monitor equipment with a serial interface from a remote location. The DTR signal could be used to trigger an SMS message or a dial-up connection to a pre-programmed number.
The GDW-11 485 has RS-232 / 422 / 485 serial interfaces.

Solutions for M-Bus applications

The AD-01 has several functions, which make it easy to build a complete network. The adapter can be used as a converter from RS-232 to M-Bus, a repeater to make the communication distance longer or to extend the distance between two M-bus networks using any kind of serial RS-232 communications equipment.

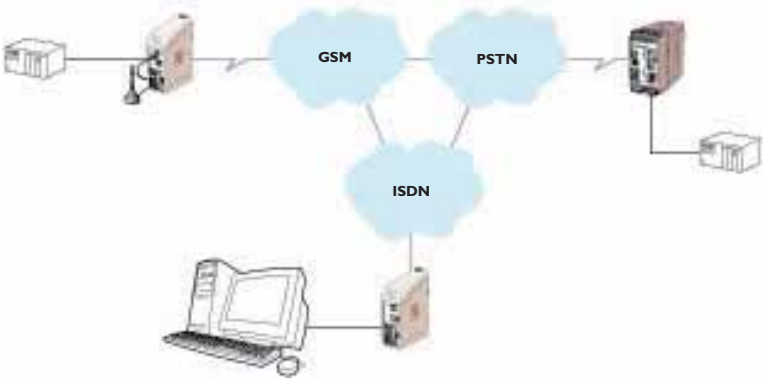


AD-01

- 2 x RS-232
- 1 x M-Bus Master
- 1 x M-Bus Slave
- Data rates up to 9.6 kbit/s
- Autobaud function
- Up to 120 M-Bus slaves
- Act as a:
  - Converter
  - Repeater
  - Zone controller

ISDN-adapter

The advantage with ISDN is the data rate as well as the fast connection time, less than 1 second compared with 15 to 25 seconds with an analogue modem. The IDW-90 also supports ther V.90 protocol, which eliminates the need for separate modems for analogue and digital data transfers. This makes it ideal for system suppliers that have installations of both types.



IDW-90

- RS-232 / 422 / 485
- Serial: up to 230 kbit/s
- ISDN: up to 128 kbit/s
- V.90 modulation
- Tri-galvanic isolation
- SMS / Dial-up via I/O / DTR

General
- RS-232, 115 kbit/s
- –25°C to +70°C
- 11 bit data format
- Password / Dial-back
- Tri-galvanic isolation
- DTR dial-up
- Watchdog
- Remote Configuration
- TD-Tool (configuration)

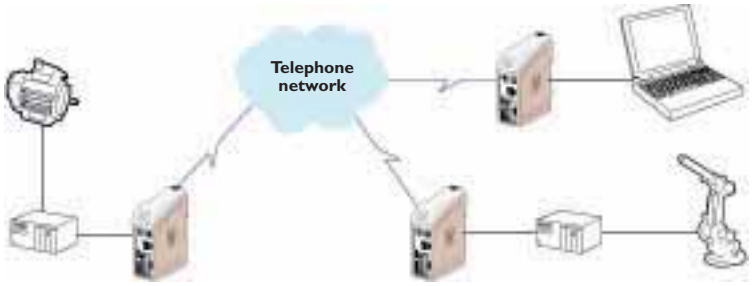
TDW-33
- Line: 56 kbit/s (V.90)

TD-36 / TD-36 485
- Line: 33.6 kbit/s with Fast Connect
- 2-wire Leased Line
- DIP-switch configuration
- V23 HDX with multidrop

TR-36
- Line: Up to 33.6 kbit/s with Fast Connect
- 2- / 4-wire Leased Line
- V23 FDX/HDX with multidrop
- RS-422/485 /115 kbit/s
- Dial-up in case of link failure on Leased Line

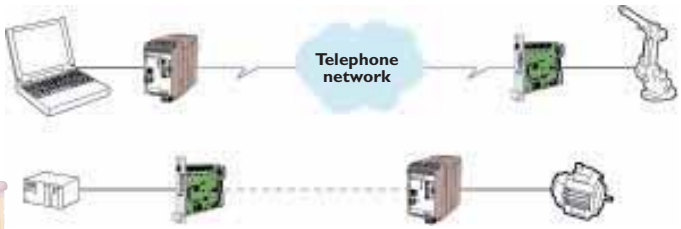
Remote connection via telephone lines

The ability to create remote connections to equipment can provide great savings both in time and money. Not only this, but improved customer service can also be offered. It is possible to control, monitor, update software or fault find, irrespective of where the equipment is located, by means of a simple remote connection.



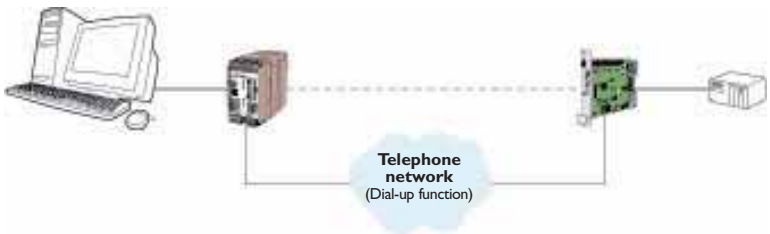
Dial-up or Leased Line Communications

The TDW-33 is used for dial-up application only, but the TD-36, TD-36 485 and TR-36 also have the ability to be used on leased lines of up to 25 km (15.5 mi).



Dial back-up on leased line failure

In case of a link failure on the leased line the TD-36 485 and TR-36 modems has the ability to automatically establish a new connection via the normal dial-up telephone line.
This is a temporary connection between the devices until the leased line is re-established again.



Remote controlled I/O

TD-36 485 has a relay output that can be controlled by AT-commands or from the remote connected TD-36 485. This feature can be used for example to switch on/off some kind of device.

Remote connection to Ethernet Networks

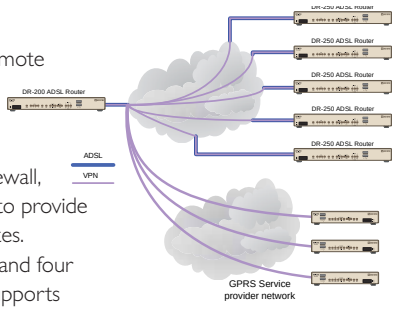
A router is a device, or in some cases software in a computer, that determines where a packet should be sent on its way to the end destination (the router is the end destination from a LAN's perspective).
Subsequently, the router is a network device that links together two or more logically separate networks. It does not connect networks blindly, but acts more as a packet switch and as a filter for the interconnection of local networks over short or long distances.

Serial and PSTN Router

The ED-200 has a serial port that can be connected to any communication product, which offers a wide range of possibilities like ISDN, GSM / GPRS, WLAN etc.

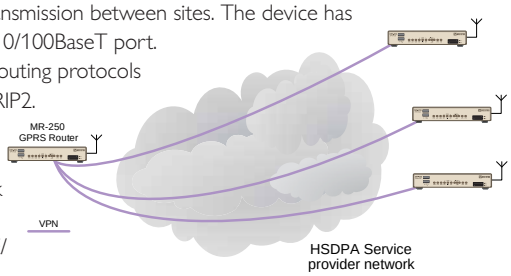
ADSL 2/2+/2++ Router

ADSL offers high speed access to remote sites over an existing analogue telephone lines, at theoretical speeds of up to 50 Mbit/s.
The DR-250 has features such as firewall, data encryption and VPN tunnelling to provide secure data transmission between sites.
The device has a serial RS-232 port and four 10 / 100BaseT ports. The DR-250 supports routing protocols such as: VRRP, OSPF and RIP2.



HSDPA/3G/GPRS Router

The MR-series has features such as firewall, data encryption and VPN tunnelling to provide secure data transmission between sites. The device has a serial RS-232 port and 10/100BaseT port.
The MR-series supports routing protocols such as VRRP, OSPF and RIP2.
The MR-250 supports fast wireless connections using HSDPA with fallback to the best alternative available 3G UMTS/EDGE/GPRS.



General

- Router with integrated switch
- Brouter with Firewall
- PPP
- SNMP
- Web tool

ED-210

- Integrated V.34 modem
- Leased Line
- Dial in /Dial out
- Call back security

ED-200

- RS-232 or RS-422
- Modem initialisation

DR-250

- Theoretical Data rate up to 50 Mbit/s
- 4 x 10 / 100BaseT
- 1 x RS-232 up to 400 kbit/s
- Asynchronous / Synchronous
- Security: Firewall / Encryption
- –20°C to +55°C
- Power: 12–24 VDC

MR-200 / MR-250

- 850, 1800, 1900 MHz GPRS, EDGE
- 2100 MHz HSDPA, 3G UMTS
- GPRS Class 10
- 2 SIM card holders
- 1 x 10 / 100BaseT
- 1 x RS-232 up to 400 kbit/s
- Asynchronous / Synchronous
- Security: Firewall / Encryption
- –20°C to +55°C
- Power: 12 – 24 VDC

TD-23
- 1 200 bit/s (V.23)
- RS-232 / 422 / 485
- Tri-galvanic isolation
- Transient protection

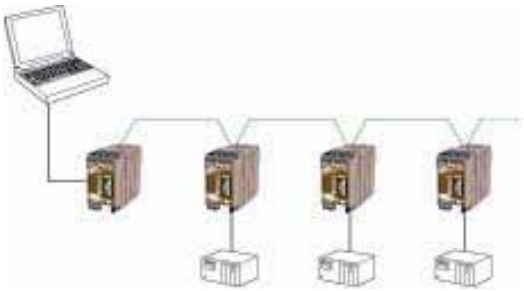
TD-29 / TD-29P
- Up to 19.2 kbit/s
- RS-232 / 422 / 485
- Watchdog
- Tri-galvanic isolation
- Transient protection

LD-0x (Multidrop)
- RS-232 (LD-01)
- RS-422 / 485 (LD-02)
- By-Pass function (LD-01)
- Tri-galvanic isolation
- Protocol independent
- Up to 38.4 kbit/s

MD-12
- RS-232
- 4-wire (half / full duplex)
- Up to 38.4 kbit/s
- Up to 18 km (11.2 mi)
- Tri-galvanic isolation
- Protocol independent

Multidrop connections via copper cable

This product range allows multidrop networks to be created using either dedicated cables or leased lines. The number of drop points and distances vary depending on which product/transmission technique is used.



Multidrop via leased lines

The TD-23 can communicate via a 2- or 4-wire leased line according to the V.23 standard.
The modem has DIP-switches allowing specific functions to be set, for example, reception sensitivity, output signal level, etc. This is of particular importance as it allows each modem to be optimized according to the line quality.
A general calculation allows 16 units over a distance of up to 25 km (15.5 miles).

Multidrop via dedicated lines

TD-29 is intended for half duplex communications via a 2-wire dedicated line. The transmission distance and number of multidrop points are affected by the number of connected modems and line quality. A typical value is 10 units up to 10 km (6.2 miles) at a transfer rate of 9600 bit/s. TD-29 is intended for use on dedicated lines and must not be connected to general or leased telecom lines. The TD-29P is designed to be used with PROFIBUS DP protocol.

Westermo's ±10 mA balanced current loop (W1) transmission technique makes it possible to transmit data up to 18 km (11.2 mi) at low data rates on a 4-wire cable. At shorter ranges transmission rates up to 38.4 kbit/s can be achieved. The LD-01 / 02 is also available in a "by-pass" version. This model ensures that if a modem in the multidrop network should fail that modem will be by-passed, hence not effecting the communications between other units on the network.

Point-to-point on dedicated copper wire

The MD-12 is used in point-to-point applications or as a start and end modem in a multidrop installation with products using W1 technology. 4-wire is needed to achieve a half or full duplex communication. The W1 technology makes it suitable to use in harsh environments.

Fibre optic solutions for LonWorks® networks

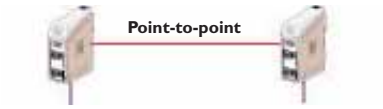
These units are used to extend the transmission range between two or more LonWorks® networks on a single- or multimode fibre optic cable up to distances of 20 km (12.4 mi). It can either be a point-to-point, multidrop or a redundant ring solution. For point-to-point applications the PP-version is used. The modems have an alarm output to indicate if any failure occurs on the fibre optic link.

LRW-102 / LRW-102PP

- 78 kbit/s TP/FT-10
- LC connectors, single- or multimode
- LC connectors, Bi-di, single- or multimode
- Regenerated optical signal
- Transparent
- Redundant Power 10 – 60 VDC, 20 – 30 VAC

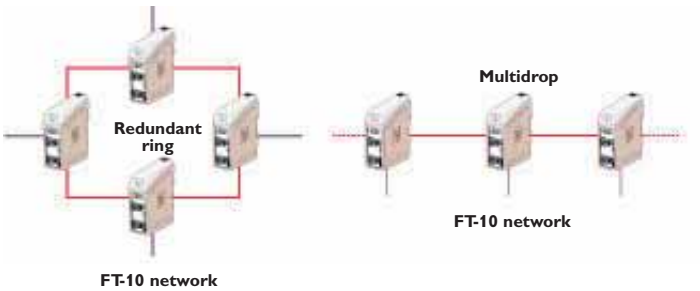
Fibre Optic Repeater

The LRW-102 is totally transparent, which gives the advantage that no software configuration via an installation tool is necessary, its just "plug & play". Because of the transparency the number of units in a multidrop or redundant ring installation is limited to ten and a total distance of 20 km (12.4 mi) fibre link.



Fibre Optic Router

The LRW-112 is based on Echelon's router module RTR-10, which makes configuration / installation possible using the LonBuilder© or LonMaker™ installation tools. The LRW-112 can be installed as repeater, configured router or learning router. The Lon-interface can be 78 kbit/s or 1.25 Mbit/s depending on model.



LRW-112 / LRW-112PP

- 78 kbit/s TP/FT-10 or 1.25 Mbit/s
- Router function (RTR-10)
- LC connectors, single- or multimode
- LC connectors, Bi-di, single- or multimode
- Regenerated optical signal
- Redundant Power 10 – 60 VDC, 20 – 30 VAC

General
- Multi- / Singlemode
- Distances up to 80 km (49.7 mi)
- Link Fault Relay
- Redundant Power 10 – 60 VDC, 20 – 30 VAC
- Galvanic isolation
- IP21
- DIP-switch configuration

ODW-61x
- PROFIBUS DP
- Up to 12 Mbit/s
- Autobaud

ODW-62x
- RS-232
- Up to 250 kbit/s

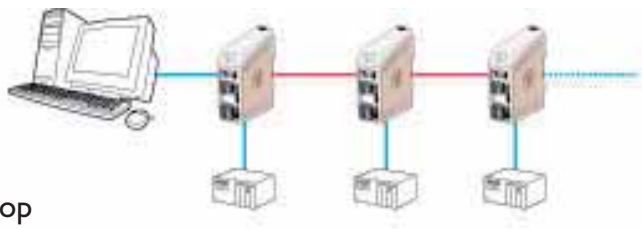
ODW-63x
- RS-422/485
- Up to 1.5 Mbit/s
- Manchester coded protocol can be tranfered

Fibre Optic

Fibre Optic cable has the advantages that it is completely insensitive to electrical and magnetic disturbances. It is therefore ideal to install as a communication media in harsh industrial environments.
It also provides benefits such as high data rates over long distances.
Depending on choice of transceiver and cable (multimode / singlemode) distances up to 80 km (49.7 mi) can be achieved. The ODW-6x1 handle temperature ranges between –40°C up to 70°C and ODW-6x2 between –40°C up to 60°C

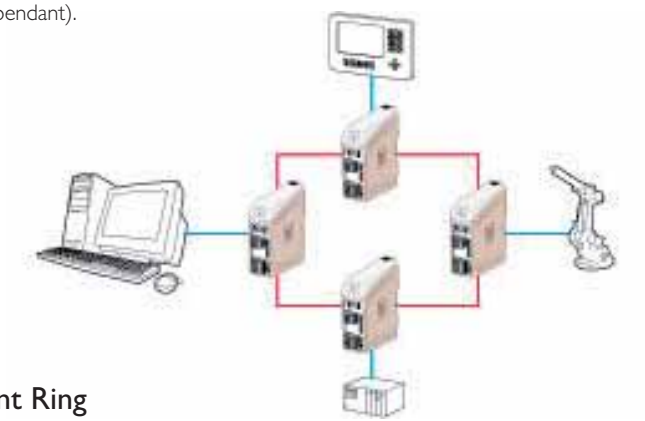
Point-to-Point

The modems can be used in point-to-point communications between two devices with serial interfaces. If two modems with different serial interfaces are used then a conversion from RS-232 to RS-422/485 can also be made over the fibre optic cable.



Multidrop

The modems can be used in multidrop applications where the connected devices have a serial interface. Depending on transceiver and cable distances up to 80 km (49.7 mi) can be achieved between each modem and with unlimited drop points (protocol dependant).



Redundant Ring

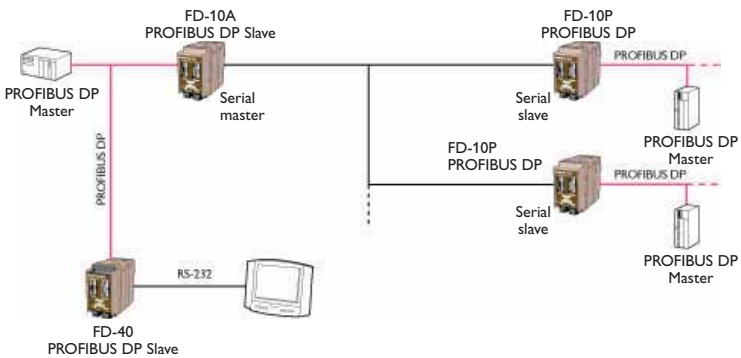
The best product choice for applications where total reliability and resilience is required is our redundant ring modems. If there is a link failure between two modems the units will automatically switch the data direction and establish a communication path in the other direction.

Solutions for PROFIBUS DP application

There are some limitations when using PROFIBUS DP because of its use of the RS-485 electrical interface. One limitation is the transmission range, which is limited to 200 m (0.13 mi) at 12 Mbit/s. The following products provide solutions where pre-existing cables / networks (Ethernet) or even a wireless solution can be used to link PROFIBUS DP networks. The FD-40 also allows an unintelligent serial device to be connected to a PROFIBUS DP network.

Serial link between PROFIBUS DP networks

The FD-10 are used to establish a serial link and transfer I/O data between two or more PROFIBUS DP networks. It could be on an existing Ethernet network, dial-up, fibre optic link or even a wireless connection via radio or GSM.
The FD-10 is used when there is a master in each PROFIBUS DP network.



Connect a serial device to a PROFIBUS DP network

The FD-40 Fieldbus converter allows devices with serial RS-232 or RS-485 interfaces to be integrated into PROFIBUS DP networks. The FD-40 works as a PROFIBUS DP slave module enabling serial data to be transmitted as normal DP process data.

FD-10 (slave)
- Up to 12 Mbit/s
- Serial RS-232 / 485 with data rates 1.2 to 38.4 kbit/s
- Transparent transmission of up to 65 DP I/O-words
- Tri-galvanic isolation

FD-40
- Up to 12 Mbit/s
- RS-232 / 485 with data rates 1.2 to 38.4 kbit/s
- 15 kbyte In/Out buffer
- 15 kbyte transmit buffer
- Tri-galvanic isolation

MDW-45
- Up to 115.2 kbit/s
- Direction controlled by data flow or RTS
- Termination and fail-safe selectable via switch
- Tri-galvanic isolation
- Protocol transparent
- –40°C to +70°C

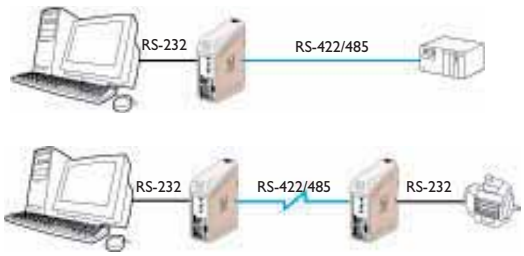
MD-21
- Up to 19.2 kbit/s
- Distances up to 6 km (3.7 mi)
- Tri-galvanic isolation
- Transmitter / Receiver active or passive
- Protocol transparent

MD-52
- Up to 115.2 kbit/s
- 9-pos. D-sub, DTE
- 9-pos. D-sub, DCE

RD-48
- Up to 1.5 Mbit/s
- Termination and fail-safe selectable via switch
- Retiming for high data rates
- 2- / 4-wire conversion

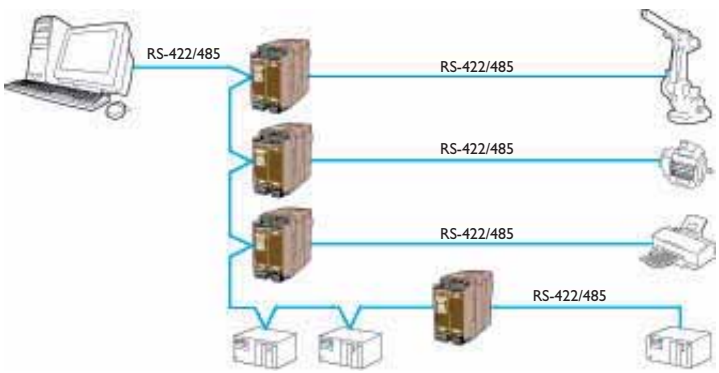
Interface Converters

The MDW-45 is a serial RS-232 to RS-422 / 485 interface converter.
The unit can also be used in point-to-point and multidrop applications on 2 or 4-wires with data rates up to 100 kbit/s and cable lengths up to 1200 metres (4000 ft).
The MD-21 is a converter between serial RS-232 and 20 mA current loop.



Serial Repeaters / Isolators

These units are used to extend distances or to provide galvanic isolation between different equipment in installations where ground potentials may cause problems.
The MD-52 is used together with RS-232 equipment and the RD-48 with RS-422 / 485.



RS-422 / 485 Repeater / Isolator

According to the standard the RS-422/485 interface is able to support a total of 32 connected devices and a transmission range of up to 1200 meters (4000 ft).
A repeater can be used to extend the range by an extra 1200 metres or to add another 32 connected devices. Up to 8 repeaters can be used in a single network.
The RD-48 can also allow star networks to be created, provide galvanic isolation between segments and correct termination of the line.

Robust Industrial Data Communications – Made Easy

The worlds developing infrastructure and our common need to conserve our natural resources require world class control and monitoring solutions. Westermo's vision is to provide reliable and easy to use data communications for these applications.

Westermo Applications Story

Newcastle airport

Newcastle International Airport (NIA) is one of the United Kingdom's fastest growing regional airports and is the dominant airport in the North East of England. The airport handled over 68,000 flights and 5.2 million passengers in 2005. Passenger satisfaction, safety and security are top priorities, but in addition NIA is committed to environmental issues. One important aspect of NIA's Environmental Policy is to ensure that contaminated surface water does not enter the local watercourses. The Ethernet switch SDW-550 and the Ethernet Extender DDW-100 are used to provide a reliable data path between automated monitoring equipment and a central Building Management System located in the main terminal building.

High reliability fibre optic modems for the Gotthard tunnel

The Gotthard tunnel is at the leading edge for traffic safety and control. Weiss-Electronic, supplier of the traffic management system, chose Westermo's fibre optic modems to provide reliable communications to the 272 traffic lights and 68 speed or emergency display screens.

Ethernet Switch used in Milking Machine

The Astronaut milking robot, manufactured by Dutch company Lely Industries N.V., is sold worldwide in high volume. The robot enhances productivity and service for farmers. It uses Ethernet communications internally for efficiency, ease of use and to reduce costs. As these robots are designed to work 24 hours a day and 7 days a week, reliability was a key issue, but it was also important to provide an optimal cost/function ratio hence Lely's decision to use the Westermo SDW-550 Ethernet switch.

Westermo Switches Used On Seattle Bus

The ERG Group, a world leader in the development and supply of integrated fare management and software systems for the transit industry, have chosen Westermo Ethernet switches to equip approximately 2500 buses operating in the Central Puget Sound Region of Washington State, around the city of Seattle. The new fare collection system provided by ERG will collect upwards of $250 million in annual passenger revenues from approximately 130 million passenger journeys per year. Low operating voltage and high reliability were the main criteria in the selection of the Westermo Ethernet switches.

www.westermo.com

Westermo Applications Story

The decade's most challenging gas field operation

Ormen Lange, which is in the North Sea off the coast of Norway (some 900 metres below the sea's surface), will be the second largest gas field on the Norwegian continental shelf and will be a major new gas source for Europe beginning in 2007. Gas processing from Ormen Lange will take place at Nyhamna in Mid- Norway and will be supplied to the UK.

Westermo's Ethernet switches have been chosen by ABB to equip the fibre optics network of the Safety and Automation System of Nyhamna's on-shore plant. This unit will be part of the processing plant for Ormen Lange gas before it is exported to England.

Hardened Ethernet Switches Serving the Environment

The Westermo Lynx range of Ethernet switches has been selected to provide the network for the monitoring, control and supervision of the Seine Grésillons SIAAP (Paris conurbation inter-departmental sanitation agency) plant in Yvelines, to the west of Paris. This is a wastewater treatment plant opened in February 2007 designed to operate with minimal manning levels. The Westermo switches have made the difference, thanks to their performance in severe environments, their reliability and their ring recovery time of less than 20 ms.

Golden Environments & National Park

The marshland located in PARQUE NACIONAL DOÑANA is one of Spain's most ecologically important sites and a major tourist destination. The park falls under the responsibility of the Ministry of Environment & National Parks.

The Ministry needed a method to monitor various different environmental variables in the marsh to build a history of its evolution, while minimizing the environmental impact. The area is inaccessible due to natural obstacles, so the stations had to be self sufficient in terms of power supply and maintenance.

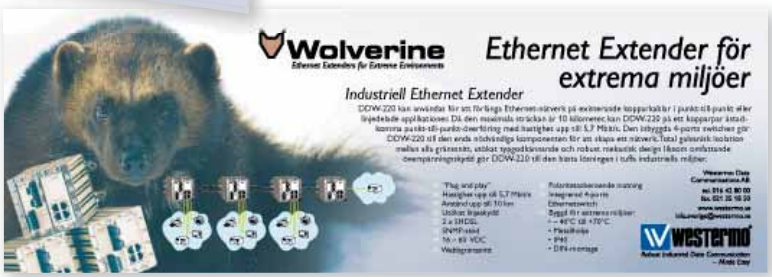
OMRON provided the total solution using PLCs and Westermo´s GSM modems and it was all powered by a solar panel. The stations collect values such as water temperature, conductivity, level, turbidity as well as wind speed, direction, rain level and vaporization. There is a central monitoring system, which collects all this data by polling each station via the GSM-modems.

www.westermo.com

More detailed information can be found on www.westermo.com

You can also download brochures, data sheets manuals etc.

Westermo Advertising from around the World



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